What is claimed:

1. A power control system for controlling the output of a laser diode, comprising:

a detector circuit adapted to detect the output of the laser diode and to produce a measured output therefrom;

a comparator adapted to compare a desired output to the measured output, and to produce an error signal therefrom;

an integrator circuit adapted to integrate the error signal, and to produce an integrated error signal therefrom; and

at least one digital-to-analog converter (DAC) adapted to use the integrated error signal to produce a current drive signal that drives the laser diode.

2. The system of claim 1, wherein the at least one DAC comprises a READ DAC that converts the integrated error signal to the current drive signal.

3. The system of claim 1, wherein the at least one DAC comprises a WRITE DAC that adjusts a write current input based on the integrated error signal.

4. A power control system for controlling the output of a laser diode, comprising:

a detector circuit adapted to detect at least a portion of the output of the laser diode and to produce a measured output therefrom;

a comparator adapted to compare a desired output to the measured output, and to produce an

error signal therefrom;

an up-down counter adapted to adjust a count value, up or down, based on the error signal; and

at least one digital-to-analog converter (DAC) adapted to use the count value to produce a current drive signal that drives the laser diode.

5. The system of claim 4, wherein the up-down counter counts down when the error signal indicates that the measured output is greater than the desired output, and counts up when the error signal indicates that the measured output is less than the desired output.

6. The system of claim 4, further comprising:

a clamp adapted to prevent the count signal from exceeding a maximum value.

7. The system of claim 4, further comprising:

a clock adapted to provide a clock signal to the up-down counter, wherein the clock signal specifies how fast the up-down counter counts.

8. The system of claim 7, wherein the clock is adapted to receive the error signal and to adjust the clock signal based on how long the error signal remains in a same state.

9. The system of claim 8, wherein:

the clock signal speeds up when the error signal remains in the same state; and

the clock signal slows down when the error signal changes state.

10. The system of claim 7, wherein the clock is adapted to receive the error signal and to adjust the clock signal based on a magnitude of the error signal.

11. The system of claim 7, wherein the clock rate can be adjusted to adjust the overall bandwidth of the power control system.

12. The system of claim 4, wherein the at least one DAC includes:

a PMAX DAC that receives the count signal and produces a reference input signal therefrom; and

a WRITE DAC that receives both the reference input and a digital write current input, and produces the current drive signal therefrom.

13. The system of claim 4, wherein the at least one DAC includes:

a READ DAC that receives the count signal and produces the current drive signal therefrom.

14. The system of claim 12, further comprising:

a current amplifier that amplifies the current drive signal before the current drive signal is provided to the laser diode.

15. The system of claim 4, wherein the detector circuit includes:

a photodetector adapted to detect the at least a portion of the output of the laser diode, and to produce a photo-detect current signal therefrom, wherein the photo-detect current signal is used to produce the measured VOUT.

16. A method for controlling the output of a laser diode, comprising:

(a) detecting at least a portion of the output of the laser diode and producing a measured output therefrom;

(b) producing an error signal based on a comparison between a desired output and the measured output;

(c) integrating the error signal to produce an integrated error signal; and

(d) using the integrated error signal to produce a current that drives the laser diode.

17. The method of claim 16, further comprising repeating steps (a) through (d) a plurality of times.

18. A method for controlling the output of a laser diode, comprising:

(a) detecting at least a portion of the output of the laser diode and producing a measured output therefrom;

(b) producing an error signal based on a comparison between a desired output and the measured output;

(c) adjusting a counter value based on the error signal; and

(d) using the counter value to produce a current that drives the laser diode.

19. The method of claim 18, further comprising repeating steps (a) through (d) a plurality of times.

20. The method of claim 19, wherein step (c) includes:

increasing the speed at which the adjusting of the counter value occurs when the error signal remains in a same state; and

decreasing the speed at which the adjusting of the counter values occurs when the error signal changes state.

21. The method of claim 19, wherein step (c) includes:

increasing the speed at which the adjusting of the counter occurs, when the magnitude of a difference between the desired output and the measured output increases; and

decreasing the speed at which the adjusting of the counter occurs, when the magnitude of the difference between the desired output and the measured output signal decreases.

22. A power control system for controlling the output of a laser diode, comprising:

a detector circuit adapted to detect at least a portion of the output of the laser diode and to produce a measured output therefrom;

a DESIRED DAC adapted to output a desired output, based on a digital input received from a register;

a comparator to compare the desired output to the measured output, and to produce an error

signal therefrom;

an up-down counter adapted to count up or down based on the count signal and to output a count signal;

a clamp adapted to receive the count signal and to output the count signal when the count signal is less than or equal to a maximum value, and to output the maximum value when the count signal is greater than the maximum value; and

at least one digital-to-analog converter (DAC) adapted to convert the output of the clamp to a current drive signal that drives the laser diode.

23. The system of claim 22, further comprising:

a clock adapted to provide a clock signal to the up-down counter, wherein the clock signal specifies how fast the up-down counter counts.

24. The system of claim 23, wherein the clock is adapted to increase the speed at which the adjusting of the counter value occurs when the error signal remains in a same state, and to decrease the speed at which the adjusting of the counter values occurs when the error signal changes state.

25. The system of claim 23, wherein the clock is adapted to adjust the clock signal based on a magnitude of a difference between the desired output and the measured output.

26. The system of claim 23, wherein the clock rate can be adjusted to adjust the overall bandwidth of the power control system.

27. A power control system for controlling the output of a laser diode, comprising:

a read power control sub-system including an first up-down counter that is used to adjust a read current signal;

a write power control sub-system including second up-down counter that is used to adjust a write current signal; and

means for reading a value of one of the first and second up-down counters and for adjusting a value of the other up-down counter based on the read value.

28. The system of claim 27, wherein only one of the first and second up-down counters is active at a time; and wherein the means for reading and adjusting reads the value of the active one of the first and second up-down counters and adjusts the value of the inactive one of the first and second up-down counters based on the read value.